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Report of nine cases of human parasitization by the brown dog tick. Seven individuals were from an apparent focus of human biting in north Texas and southeastern Oklahoma. These cases suggest that this tick may play a more important role in the transmission of pathogens to humans than previously believed.

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**Additional Instances of Human Parasitism by the Brown Dog Tick,
Rhipicephalus sanguineus (Acari: Ixodidae)**

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Abstract

We report nine cases of humans parasitized by the brown dog tick, Rhipicephalus sanguineus (Latreille). Eight cases occurred during 1989. Seven of the individuals were from an apparent focus of human biting in northern Texas and southwestern Oklahoma, one case was from San Antonio, Bexar County, Texas, and one case was from Homestead Air Force Base, Dade County, Florida. These cases suggest that the role of R. sanguineus in the transmission of canine ehrlichiosis to humans may be underestimated and warrants investigation.

Key Words: Arachnida, Ixodidae, Rhipicephalus sanguineus, brown dog tick, human, parasitism, ehrlichiosis.

Goddard (1989) documented nine cases of human parasitism by the brown dog tick, Rhipicephalus sanguineus (Latreille), that occurred during a 3 year period (1986-1988) in central Texas and southwestern Oklahoma. We report nine additional cases: eight that occurred during 1989 and a previously unreported case that occurred in 1980. This information is important with respect to the transmission of pathogens to humans by the brown dog tick. These pathogens cause Rocky Mountain spotted fever in Mexico and boutonneuse fever in Europe. The brown dog tick has the potential for transmitting Ehrlichia canis, the rickettsia that causes canine ehrlichiosis, as well as other pathogens, to humans (Goddard 1988).

During 1989, 46 collections of ticks, comprising a total of eight species, were submitted to the Epidemiology Division at the School of Aerospace Medicine, Brooks Air Force Base, San Antonio, Texas. Fourteen collections from a total of eight bases contained specimens of R. sanguineus. Of the 39 R. sanguineus specimens received, a total of nine were attached to eight humans (Table 1). Determinations for these nine ticks were confirmed by J. E. Keirans (Museum Support Center, Smithsonian Institution; Washington, D. C.) and the specimens were deposited as voucher specimens in the museum collection. A review of R. sanguineus specimens in the Medical Entomology Section's arthropod collection revealed an additional specimen, a partially engorged nymph collected in 1980 from a child at Sheppard Air Force Base, Wichita County, Texas (Table 1).

Of the eight human cases that occurred in 1989, six were within the focus in southwestern Oklahoma and northern Texas delineated by Goddard (1989); the 1980 case also occurred within the focus. Of the remaining two 1989 cases, one occurred in Bexar County, Texas, approximately 250 miles south of the area delineated by Goddard, and one occurred in Dade County, Florida, approximately 1,250 miles southeast of Goddard's focus.

Eight of the nine human hosts documented in our study were children; of the seven children for whom sex is known, all were females. The average age of the four children whose ages are known was 5 years. The only known male parasitized was also the only adult; his age was believed to be 20 to 30 years. Goddard (1989) observed a closely matched distribution between the sexes in his study (five males, four females); more children were attacked than adults (five children, three adults, one patient's age unknown). Based upon the data published in these two reports, it appears that children are more susceptible to attack by the brown dog tick (13 children, four adults parasitized). This susceptibility may be due to children's closer association with pet animals (Doran et al. 1989). Roberts (1935) found a direct association between R. sanguineus infested dogs and human bites by R. sanguineus, particularly for children, in Kenya.

Seven of the ten ticks removed from humans in this study were nymphs and three were adults, a ratio of 2:1. This ratio contrasts with the experience of Goddard (1989) who identified three nymphs and twelve adults for a ratio of 1:4. Seven of the ticks documented in

this study were partially engorged; three were unengorged. Goddard (1989) recorded the same 2:1 ratio (ten engorged, five unengorged). The engorgement status indicates that these ticks were at least partially successful at feeding on a human host.

Of the ten ticks reported in our study, the adult male tick was collected during the spring (April 1989), two nymphs and one female were collected during the summer (June-August), and five nymphs and one female were collected during the fall (September-October 1989). Goddard (1989) documented one male collected during the spring (April 1988); one nymph, three males, and four females collected during the summer (July-August); and two nymphs, two males, and two females collected during the fall (September-October). These data indicate that human parasitism by the brown dog tick occurs predominately during the summer and fall. Roberts (1935) found that R. sanguineus infestations occurred more frequently during cool weather in Kenya; coincidentally, the incidence of boutonneuse fever was greatest in the colder months of the year.

In the United States, R. sanguineus is the vector of E. canis among dogs (Groves et al. 1975). Human cases of ehrlichiosis in Oklahoma (Harkess et al. 1989) and other states (Simmons and Hughey 1989, Peterson et al. 1989) indicate a history of tick exposure, but the identity of those ticks remains in question (Fishbein et al. 1989). The belief that R. sanguineus rarely bites humans (Nelson 1969) has led some authors (e.g., Ewing et al. 1987) to disregard this species as a vector of Ehrlichia to humans in favor of other,

more anthropophilic ticks. The increasing number of documented cases of human parasitism by R. sanguineus suggests that we should reexamine our understanding of the host range of this tick in North America as well as examine the vector competence of other species.

Acknowledgments

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Footnotes

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Table 1. New records of Rhipicephalus sanguineus ticks parasitizing humans.

Date	Tick Data				Patient Data	
	Place Collected	Number	Stage	Status*	Accession Number	Age Sex
30 Jun 80	Wichita Co., TX	1	nymph	PE	119804	child unknown
22 Apr 89	Wichita Co., TX	1	adult male	PE	119776	child female
-- Jun 89	Bexar Co., TX	1	nymph	UE	119777	7 yr female
24 Aug 89	Lubbock Co., TX	1	adult female	PE	119779	adult male
13 Sep 89	Jackson Co., OK	1	nymph	UE	119778	5 yr female
23 Sep 89	Jackson Co., OK	1	nymph	UE	119780	5 yr female
07 Oct 89	Lubbock Co., TX	1	nymph	PE	119781	child female
13 Oct 89	Jackson Co., OK	1	adult female	PE	119782	2 yr female
27 Oct 89	Dade Co., FL	2	nymphs	PE	119783	child female

*UE = unengorged, PE = partially engorged

Running Head

Carpenter et al., Human Parasitism by Rhipicephalus sanguineus